



Natural Resources Conservation Service

Grazing and Carbon Sequestration Fact Sheet

Grazing and Grassland Management Can Improve Air Quality Through Carbon Sequestration

With increasing levels of carbon dioxide (CO₂) and greenhouse gases (GHG) in the environment, there are several management practices livestock producers can implement on the farm to help reduce the amount of CO₂ and GHG in the air and increase carbon levels in the soil. Carbon sequestration is the process of converting CO₂ in the air into carbon in the soil. One of the main vehicles for this process is high producing vegetative forages in a grazing system.

Carbon sequestration is a normal occurring process; however, on grazing lands and grasslands, rotational grazing through a Prescribed Grazing Management Plan can increase the amount of carbon sequestered. Proper grazing management allows plants to grow longer during the grazing season, producing a higher quantity and quality of forage. As plants grow, they sequester carbon into the soil through photosynthesis. During the growth cycle, plants grow in two dimensions. Through the growth process, plants will make top-growth through the development of leaves and stems. At the same time, the root system of the plant grows becoming an extensive network of carbohydrate reserves and carbon-based plant structures. As the plants die or pastures are clipped, the plant residue breaks down and becomes soil organic matter, thus sequestering carbon from the atmosphere. Figure 1

exhibits a model of the terrestrial carbon cycle.

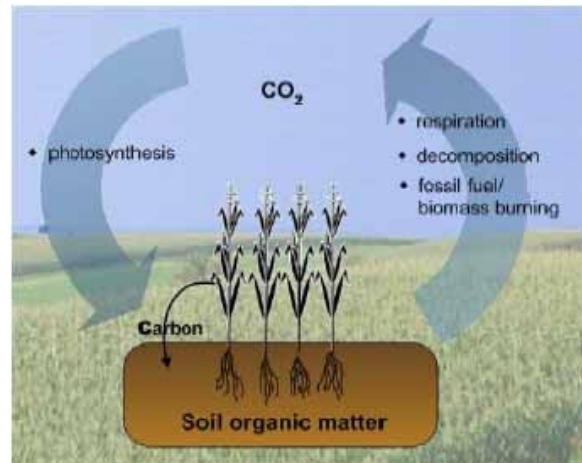


Figure 1. Terrestrial carbon cycle. Purdue University-CASMGs

Livestock producers can enhance carbon sequestration on their operations through a number of methods.

Converting from a continuous grazing to a rotational grazing system can help by keeping the forages on the operation in a vegetative state during the grazing season. This management practice keeps the plants in an actively growing state, thus keeping photosynthesis rates at higher levels, allowing the forages to sequester more carbon.

In Pennsylvania, NRCS has applied Prescribed Grazing Management on more than 15,000 acres in 2005 which is making potential impacts. In addition, there are several producer-led grazing organizations established in Pennsylvania. The Pennsylvania Grazing/Forage Lands Conservation

Coalition (GLCI) promotes educational outreach activities aimed at teaching livestock producers about rotational grazing and proper grassland management. PA Project Grass has five regional chapters established across the state. These chapters are producer-led organizations created to help get rotational grazing and grassland management practices installed on farms across Pennsylvania.

Rotational grazing and proper grassland management are important to carbon sequestration, not only in the methods outlined above but help reduce CO₂ emissions in the air. Rotational grazing allows livestock to harvest the forages on the farm reducing the amount of fossil fuels producers burn. Rotational grazing also promotes an even distribution of manure across pastures reducing the amount of chemical fertilizers that are required for proper soil fertility.



As more acres of cropland are converted to pasture, the distance of the new pastures from the farmstead increases. Solar energy is becoming more popular as technology continues to improve. Livestock producers continue to look at energy efficient methods to power water systems and fence energizers.



Livestock producers can reduce their needs for electricity and fossil fuels by using energy-free methods to pump water for livestock. Several types of energy-free pumps have been in existence for years. Ram and sling pumps utilize flowing water as the power source for the water pump. Nose pumps are another type of pump used to water livestock. Livestock activate the pump with their noses and draw water to drink.

For more information on grazing management, contact a local Pennsylvania NRCS Service Center.

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